Clinical Outcomes Following Reconstruction of Stage II Flatfoot in Obese Patients Compared to Controls

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My disclosure is in the Final AOFAS Mobile App.

I have no potential conflicts with this presentation.
Obesity has been identified as a risk factor in the etiology of Adult Acquired Flatfoot Deformity (AAFD)\(^1\)

The contribution of obesity to patient outcomes following AAFD reconstruction is unknown

The Foot and Ankle Outcome Score (FAOS) is validated for AAFD\(^2\)

**QUESTION:** is increased body mass index (BMI) associated with a difference in FAOS outcomes for AAFD reconstruction?
### Inclusion Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage II AAFD reconstruction</td>
<td>Bilateral AAFD reconstruction</td>
</tr>
<tr>
<td>• Medializing posterior calcaneal osteotomy, concomitant procedures[^3]</td>
<td></td>
</tr>
<tr>
<td>• Between 1/1/2007 and 6/30/2012</td>
<td></td>
</tr>
<tr>
<td>• One of two orthopaedic foot/ankle surgeons at the same institution</td>
<td></td>
</tr>
<tr>
<td>FAOS (pre-op, at least 1 year post-op)</td>
<td>Subtalar or talonavicular fusion[^4]</td>
</tr>
<tr>
<td>Weightbearing AP/lateral radiographs (pre-op, at least 1 year post-op)</td>
<td>Triple arthrodesis</td>
</tr>
</tbody>
</table>

Total # of patients: **93** (average 2.5-year follow-up)
Methods of BMI Analysis

BMI was analyzed in three ways:
• Continuous variable
• 3-category variable
  – Normal, overweight, obese
  – BMI ranges as defined by the World Health Organization (WHO)[5]
• 2-category variable
  – Non-obese, obese
  – Non-obese range encompassing WHO’s normal and overweight categories

<table>
<thead>
<tr>
<th>BMI</th>
<th>3 Categories (WHO)</th>
<th>2 Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25</td>
<td>Normal</td>
<td>Non-Obese</td>
</tr>
<tr>
<td>Between 25 and 30</td>
<td>Overweight</td>
<td>Non-Obese</td>
</tr>
<tr>
<td>Greater than 30</td>
<td>Obese</td>
<td>Obese</td>
</tr>
</tbody>
</table>
Methods of FAOS Analysis

The FAOS has five subscales:

- Pain
- Symptoms
- Daily Activities
- Sports
- Quality of Life

FAOS scores were compared in three ways:

- Comparing pre-operative scores
- Comparing post-operative scores
- Comparing the pre-to post-operative changes in scores
BMI Results

Results of $p < 0.05$ were considered significant.

• **Continuous BMI:** increasing BMI correlated **negatively** with...
  - Pre-operative Symptoms $(p = 0.004)$
  - Pre-operative Daily Activities $(p = 0.018)$
  - Post-operative Sports $(p = 0.043)$

• **3-category BMI:** obese patients had **significantly worse** scores in...
  - Pre-operative Symptoms $(p = 0.044)$

• **2-category BMI:** obese patients had **significantly worse** scores in...
  - Pre-operative Symptoms $(p = 0.038)$
Complications

• We also tested whether FAOS scores were affected by the occurrence of a complication requiring surgical intervention\(^6\), including:
  – Irrigation and debridement
  – Open reduction and internal fixation
  – Revision anterior or posterior calcaneal osteotomy

• 8 patients in total had complications

• Patients with complications showed \textit{significantly worse} scores in...
  – Pre-operative Symptoms \(p = 0.012\)
  – Post-operative Symptoms \(p = 0.028\)
  – Post-operative Quality of Life \(p = 0.039\)
  – Post-operative Daily Activities \(p = 0.004\)
  – Pre- to post-operative change in Sports \(p = 0.036\)
## Complete Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time Point</th>
<th>p-val (continuous BMI)</th>
<th>p-val (3-category BMI)</th>
<th>p-val (2-category BMI)</th>
<th>p-val (complications)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pain</strong></td>
<td>Pre-Op</td>
<td>0.085</td>
<td>0.168</td>
<td>0.059</td>
<td>0.841</td>
</tr>
<tr>
<td></td>
<td>Post-Op</td>
<td>0.255</td>
<td>0.662</td>
<td>0.472</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>0.741</td>
<td>0.809</td>
<td>0.515</td>
<td>0.162</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>Pre-Op</td>
<td>0.004 <strong>0.038</strong></td>
<td>0.044</td>
<td>0.012</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>Post-Op</td>
<td>0.325</td>
<td>0.828</td>
<td>0.574</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>0.133</td>
<td>0.239</td>
<td>0.267</td>
<td>0.815</td>
</tr>
<tr>
<td><strong>Daily Activities</strong></td>
<td>Pre-Op</td>
<td>0.018 <strong>0.114</strong></td>
<td>0.073</td>
<td>0.428</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Post-Op</td>
<td>0.086</td>
<td>0.293</td>
<td>0.117</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>0.508</td>
<td>0.466</td>
<td>0.768</td>
<td>0.815</td>
</tr>
<tr>
<td><strong>Sports</strong></td>
<td>Pre-Op</td>
<td>0.186</td>
<td>0.215</td>
<td>0.547</td>
<td>0.312</td>
</tr>
<tr>
<td></td>
<td>Post-Op</td>
<td><strong>0.043</strong></td>
<td>0.251</td>
<td>0.113</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>0.967</td>
<td>0.473</td>
<td>0.429</td>
<td><strong>0.036</strong></td>
</tr>
<tr>
<td><strong>Quality of Life</strong></td>
<td>Pre-Op</td>
<td>0.215</td>
<td>0.132</td>
<td>0.548</td>
<td>0.828</td>
</tr>
<tr>
<td></td>
<td>Post-Op</td>
<td>0.328</td>
<td>0.833</td>
<td>0.836</td>
<td><strong>0.039</strong></td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>0.872</td>
<td>0.831</td>
<td>0.889</td>
<td>0.088</td>
</tr>
</tbody>
</table>

Note: results of $p < 0.05$ were considered significant.
These results suggest that BMI affects the success of AAFD reconstruction less than previously hypothesized.

Though heavier patients reported worse pre-operative Symptoms and Daily Activities scores, their post-operative scores did not differ significantly from those of lighter patients.

Having complications negatively impacted multiple patient outcome scores; however, greater BMIs were not correlated with complications ($p=0.942$).

Heavier patients’ worse post-operative Sports scores may be due to side effects of obesity causing difficulty returning to pre-operative levels of intense physical activity.
**Hypothesis:** obesity has an adverse effect on patient outcomes of AAFD reconstruction
- Increasing BMI correlates negatively with patient outcome scores
- Patients with higher BMI have worse overall outcome scores

**Method:** compared AAFD reconstruction patients’ BMI to pre- and post-operative FAOS scores

**Results:** increased BMI showed strong correlations with lower pre-operative but not post-operative Symptoms and some correlation with lower pre-operative Daily Activities and post-operative Sports.
→ Overall, evidence did not show strong correlations between increased BMI and worse post-operative outcomes.

**Conclusions:** results suggest that BMI affects the success of AAFD reconstruction less than previously hypothesized.
→ Barring other contraindications, we believe that AAFD reconstruction can be performed successfully in heavier patients to achieve improvements in outcomes similar to those of patients with lower BMIs.
References


